

US

WHAT IS CLAIMED IS:

1. A method for adjusting the centering of a raster in a rear projection television receiver, said method comprising the steps:

mounting optical sensors on the inside of the rear projection television receiver outside of a display screen at both lateral sides of the display screen;

displaying a test pattern consisting of a raster center adjust pattern; and

adjusting the centering of the raster based on the outputs of the optical sensors located on the lateral sides of the display screen.

2. The method for adjusting the centering as claimed in claim 1, wherein said adjusting step comprises:

setting a centering control at a one extreme value;

measuring the output voltages generated by the lateral optical sensors;

calculating the centering error by determining the absolute value of the difference between the output voltages;

incrementally adjusting the centering control away from said one extreme value; and

repeating said measuring, calculating and incrementally adjusting steps until the centering error is at a minimum value.

US

3. A method for adjusting a width of a raster in a rear projection television receiver, said method comprising the steps:

mounting optical sensors on the inside of the rear projection television receiver outside of a display screen at both lateral sides of the display screen;

displaying a test pattern consisting of a raster projection pattern; and

adjusting the width of the raster based on the outputs of the optical sensors located on the lateral sides of the display screen.

4. The method for adjusting a width as claimed in claim 3, wherein said adjusting step comprises:

setting a width control for the raster to a maximum value;

measuring the output voltages generated by the lateral optical sensors;

calculating the width error by determining the sum of the output voltages;

incrementally decreasing the width control; and

repeating said measuring, calculating and incrementally decreasing steps until the width error equals a minimum value.

US

5. A method for adjusting a linearity of a raster in a rear projection television receiver, said method comprising the steps:

mounting optical sensors on the inside of the rear projection television receiver outside of a display screen at the top and bottom of the display screen;

displaying a test pattern consisting of a raster projection pattern; and

adjusting the linearity of the raster based on the outputs of the optical sensors located at the top and bottom of the display screen.

6. The method for adjusting a linearity as claimed in claim 5, wherein said adjusting step comprises:

setting a linearity control to one extreme value; measuring the output voltages generated by the top and bottom optical sensors;

calculating the linearity error by determining the absolute value of the difference of the output voltages;

incrementally adjusting the linearity control away from said one extreme value; and

repeating said measuring, calculating and incrementally adjusting steps until the linearity error equals a minimum value.

7. A method for adjusting a height of a raster in a rear projection television receiver, said method comprising the steps:

US

mounting optical sensors on the inside of the rear  
projection television receiver outside of a display screen at the  
5 top and bottom of the display screen;

displaying a test pattern consisting of a raster  
projection pattern; and

adjusting the height of the raster based on the outputs  
of the optical sensors located at the top and bottom of the display  
10 screen.

8. The method for adjusting a height as claimed in claim 7,  
wherein the adjusting step comprises:

setting a height control for the raster to a maximum  
value;

measuring the output voltages generated by the top and  
bottom optical sensors;

calculating the height error by determining the sum of  
the output voltages;

incrementally decreasing the height control; and

10 repeating said measuring, calculating and incrementally  
decreasing steps until the height error equals a minimum value.

9. A method for adjusting a raster geometry in a rear  
projection television receiver, said method comprising the steps:

US

mounting optical sensors on the inside of the rear  
projection television receiver outside of a display screen at both  
5 lateral sides and above and below the display screen;

setting the height and width controls for the raster to  
respective maximum values;

displaying a first test pattern consisting of a raster  
projection pattern;

10 measuring and storing the maximum output from said  
optical sensors;

displaying a second test pattern consisting of a center  
adjust pattern;

15 adjusting the centering of the raster based on the  
outputs of the optical sensors located on the lateral sides of the  
display screen;

displaying the first test pattern;

20 adjusting the width of the raster based on the outputs of  
the optical sensors located on the lateral sides of the display  
screen;

adjusting the height of the raster based on the outputs  
of the optical sensors located above and below the display screen;

25 adjusting the linearity of the raster based on the  
outputs of the optical sensors located above and below the display  
screen; and

US

re-adjusting the height of the raster based on the outputs of the optical sensors located above and below the display screen.

10. The method for adjusting the raster geometry as claimed in claim 9, wherein said step of adjusting the centering comprises:

setting a centering control at a one extreme value;

measuring the output voltages generated by the lateral optical sensors;

calculating the centering error by determining the absolute value of the difference between the output voltages;

incrementally adjusting the centering control away from said one extreme value; and

repeating said measuring, calculating and incrementally adjusting steps until the centering error is at a minimum value.

11. The method for adjusting the raster geometry as claimed in claim 10, wherein said step of adjusting the width comprises:

setting a width control for the raster to a maximum value;

measuring the output voltages generated by the lateral optical sensors;

calculating the width error by determining the sum of the output voltages;

incrementally decreasing the width control; and

US

10           repeating said measuring, calculating and incrementally  
decreasing steps until the width error equals a minimum value.

12.           The method for adjusting the raster geometry as claimed  
in claim 11, wherein said step of adjusting the height comprises:  
              setting a height control for the raster to a maximum  
value;

5           measuring the output voltages generated by the top and  
bottom optical sensors;

              calculating the height error by determining the sum of  
the output voltages;

              incrementally decreasing the height control; and

10           repeating said measuring, calculating and incrementally  
decreasing steps until the height error equals a minimum value.

13.           The method for adjusting the raster geometry as claimed  
in claim 12, wherein said step of adjusting the linearity  
comprises:

              setting a linearity control to one extreme value;

5           measuring the output voltages generated by the top and  
bottom optical sensors;

              calculating the linearity error by determining the  
absolute value of the difference of the output voltages;

10           incrementally adjusting the linearity control away from  
said one extreme value; and

US

repeating said measuring, calculating and incrementally adjusting steps until the linearity error equals a minimum value.

14. An arrangement for adjusting a raster geometry in a rear projection television receiver, said rear projection television receiver having an input for receiving television signals, a video processing circuit for processing said received television signals and for forming color video signals and deflection control signals, color video signal projectors for projecting light signals corresponding to said color video signals in dependence on said deflection signals, and a display screen on which said light signals are projected, wherein said video signal processing circuit includes control input means for receiving control signals for controlling a centering, height, width and linearity of a raster formed by at least one of said color video signal projectors, characterized in that said arrangement comprises:

a pattern generator coupled to the video signal processing circuit for applying selected test patterns to said video signal processing circuit, said test patterns including a center adjust pattern and a raster projection pattern;

a plurality of optical sensors mounted inside of the rear projection television receiver outside of the display screen at both lateral sides and above and below the display screen;

a sensor output selector for selecting an output signal from one of said plurality of optical sensors;



US

an analog-to-digital converter for digitally converting the selected optical sensor output signal;

25 a controller having an input coupled to receive the digitally converted sensor output signal, a first output coupled to said sensor output selector for selecting one of the sensor output signals, a second output coupled to the video signal processing circuit for causing the video signal processing circuit to process the test pattern from the pattern generator, a third output coupled to the pattern generator for selecting one of the test patterns, and fourth outputs coupled to the control input means of the video signal processing circuit for controlling the centering, height, width and linearity of the raster generated by said one color video signal projector, wherein said controller performs the following functions:

30 sets the height and width controls for the raster to respective maximum values;

35 displays a first test pattern consisting of a raster projection pattern;

40 measures and stores the maximum output from said optical sensors;

displays a second test pattern consisting of a center adjust pattern;

45 adjusts the centering of the raster based on the outputs of the optical sensors located on the lateral sides of the display screen;

US

displays the first test pattern;

adjusts the width of the raster based on the outputs of  
50 the optical sensors located on the lateral sides of the display  
screen;

adjusts the height of the raster based on the outputs of  
the optical sensors located above and below the display screen;

adjusts the linearity of the raster based on the outputs  
55 of the optical sensors located above and below the display screen;  
and

re-adjusts the height of the raster based on the outputs  
of the optical sensors located above and below the display screen.